BROOKHAVEN NATIONAL LABORATORY

Work Permit # DRL-2011-5/SS-2011-
Work Order # _____
Job# _____ Activity# _____

1. Work requester fills out this section. ☐ **Standing Work Permit**

Requester: Don Lynch	Date: 3/28/2011	Ext.: 2253	Dept/Div/Group: PO/PHENIX
Other Contact person (if different from requester): Carter Biggs			Ext.: 7515
Work Control Coordinator: Don Lynch		Start Date: 3/30/2011	Est. End Date: 4/15/2011
Brief Description of Work: Vendor repairs for VTX chiller (repair refrigerant slow leak)			
Building: 1008	Room: RHIC tunnel N&S of PHENIX	Equipment: RPC Scintillators	Service Provider: PHENIX mech. and elec. techs

. WCC, Requester/Designee, Service Provider, and ES&H (as necessary) fill out this section or attach analysis

ES&H ANALYSIS				
Radiation Concerns	☒ None	☐ Activation	☐ Airborne	☐ Contamination	☐ Radiation
Radiation Generating Devices:	☐ Radiography	☐ Moisture Density Gauges	☐ Soil Density Gauges	☐ X-ray Equipment
☐ Special nuclear materials involved, notify Isotope Special Materials Group			☐ Fissionable materials involved, notify Laboratory Criticality Officer	
Safety Concerns	☐ None	☐ Ergonomics	☐ Transport of Haz/Rad Material	
☐ Adding/Removing Walls or Roofs	☐ Confined Space*	☐ Explosives	☐ Lead*	☐ Penetrating Fire Walls
	☐ Corrosive	☐ Flammable	☐ Magnetic Field*	☐ Pressurized Systems
☐ Asbestos*	☐ Cryogenic	☐ Fumes/Mist/Dust*	☐ Material Handling	☐ Rigging/Critical Lift
☐ Beryllium*	☐ Electrical	☐ Heat/Cold Stress	☐ Noise*	☐ Toxic Materials*
☐ Biohazard*	☒ Elevated Work*	☐ Hydraulic	☐ Non-ionizing Radiation*	☐ Vacuum
☐ Chemicals*	☐ Excavation	☐ Lasers*	☒ Oxygen Deficiency*	☐ Other
* Does this work require medical clearance or surveillance from the Occupational Medicine Clinic? ☒ Yes ☒ No for elevated work, yes for ODH				
Environmental Concerns		☒ None	☐ Work impacts Environmental Permit No.	
☐ Atmospheric Discharges (rad/non-rad)		☐ Land Use	☐ Soil Activation/contamination	☐ Waste-Mixed
☐ Chemical or Rad Material Storage or Use		☐ Liquid Discharges	☐ Waste-Clean	☐ Waste-Radioactive
☐ Cesspools (UIC)		☐ Oil/PCB Management	☐ Waste-Hazardous	☐ Waste-Regulated Medical
☐ High water/power consumption		☐ Spill potential	☐ Waste-Industrial	☐ Underground Duct/Piping
Waste disposition by:				☐ Other
Pollution Prevention (P2)/Waste Minimization Opportunity:		☒ None ☐ Yes		
FACILITY CONCERNS	☒ None			
☐ Access/Egress Limitations	☐ Electrical Noise	☐ Potential to Cause a False Alarm		☐ Vibrations
	☐ Impacts Facility Use Agreement		☐ Temperature Change	☐ Other
☐ Configuration Control	☐ Maintenance Work on Ventilation Systems		☐ Utility Interruptions	
WORK CONTROLS				
Work Practices				
☐ None	☐ Exhaust Ventilation	☐ Lockout/Tagout	☐ Spill Containment	☐ Security (see Instruction Sheet)
☒ Back-up Person/Watch (Escort)	☐ HP Coverage	☐ Posting/Warning Signs	☐ Time Limitation	☐ Other
☐ Barricades	☐ IH Survey	☐ Scaffolding-requires inspection	☐ Warning Alarm (i.e. “high level”)	
Protective Equipment				
☐ None	☐ Ear Plugs	☒ Gloves	☐ Lab Coat	☒ Safety Glasses
☐ Coveralls	☐ Ear Muffs	☐ Goggles	☐ Respirator	☐ Safety Harness
☐ Disposable Clothing	☐ Face Shield	☐ Hard Hat	☐ Shoe Covers	☒ Safety Shoes ☐ Other
Permits Required (Permits must be valid when job is scheduled.)				
☒ None	☐ Cutting/Welding	☐ Impair Fire Protection Systems		
☐ Concrete/Masonry Penetration	☐ Digging/Core Drilling	☐ Rad Work Permit-RWP No		
☐ Confined Space Entry	☐ Electrical Working Hot	☐ Other		
Dosimetry/Monitoring				
☐ None	☐ Heat Stress Monitor	☐ Real Time Monitor	☐ TLD	
☐ Air Effluent	☐ Noise Survey/Dosimeter	☐ Self-reading Pencil Dosimeter	☐ Waste Characterization	
☐ Ground Water	☐ O_2/Combustible Gas	☐ Self-reading Digital Dosimeter	☒ Other O_2 monitor and escape PAK	
☐ Liquid Effluent	☐ Passive Vapor Monitor	☐ Sorbent Tube/Filter Pump		
Training Requirements (List below specific training requirements)				
ODH1, Escape Pak toolkit, ODH medical clearance, PHENIX Awareness, CAD Access, also must had RAD worker 1 or be listed on RPC badge list.				

Based on analysis above, the Walkdown Team determines the risk, complexity, and coordination ratings below:				**If using the permit when all hazard ratings are low, only the following need to sign: (Although allowed, there is no need to use back of form)**	
ES&H Risk Level:	☒ Low	☐ Moderate	☐ High	WCC:	Date:
Complexity Level:	☒ Low	☐ Moderate	☐ High	Service Provider:	Date:
Work Coordination:	☐ Low	☒ Moderate	☐ High	Authorization to start	Date:
				(Departmental Sup/WCC/Designee)	

3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

Work Plan (procedures, timing, equipment, and personnel availability need to be addressed): PHENIX techs will reposition and align 4 scintillator "paddle" sensors in the section 7 and 8 RHIC tunnel areas immediately north and south of the PHENIX IR. Details are provided in the attached project description.
Special Working Conditions Required: No
Operational Limits Imposed: No
Post Work Testing Required: No

Job Safety Analysis Required: ☐ Yes ☒ No	Walkdown Required: ☒ Yes ☐ No

Reviewed by: Primary Reviewer will determine the size of the review team and the other signatures required based on hazards and job complexity. Primary Reviewer signature means that the hazards and risks that could impact ES&H have been identified and will be controlled according to BNL requirements.

Title	Name (print)	Signature	Life #	Date
Primary Reviewer				
ES&H Professional				
Other				
Other				
Work Control Coordinator	Don Lynch		20146	
Service Provider				
	Review Done: ☐ in series	☐ team		

4. Job site personnel fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments).			
Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:
Workers are encouraged to provide feedback on ES&H concerns or on ideas for improved job work flow. Use feedback form or space below.			

5. Departmental Job Supervisor, Work Control Coordinator/Designee

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)			
Name:	Signature:	Life#:	Date:

6. Departmental Job Supervisor, Work Requester/Designee determines if Post Job Review is required. ☐ Yes ☐ No

Post Job Review (Fill in names of reviewers)			
Name:	Signature:	Life#:	Date:
Name:	Signature:	Life#:	Date:

7. Worker provides feedback.

Worker Feedback (use attached sheets as necessary)
a) WCM/WCC: Is any feedback required? ☐ Yes ☐ No

b) Workers: Are there better methods or safer ways to perform this job in the future? ☐ Yes ☐ No

8. Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of work area to work supervisor)

Name:	Signature:	Life#:	Date:
Comments:			

RPC3 Background Attenuation Project

Attenuation Monitoring

Don Lynch, March 24, 2011

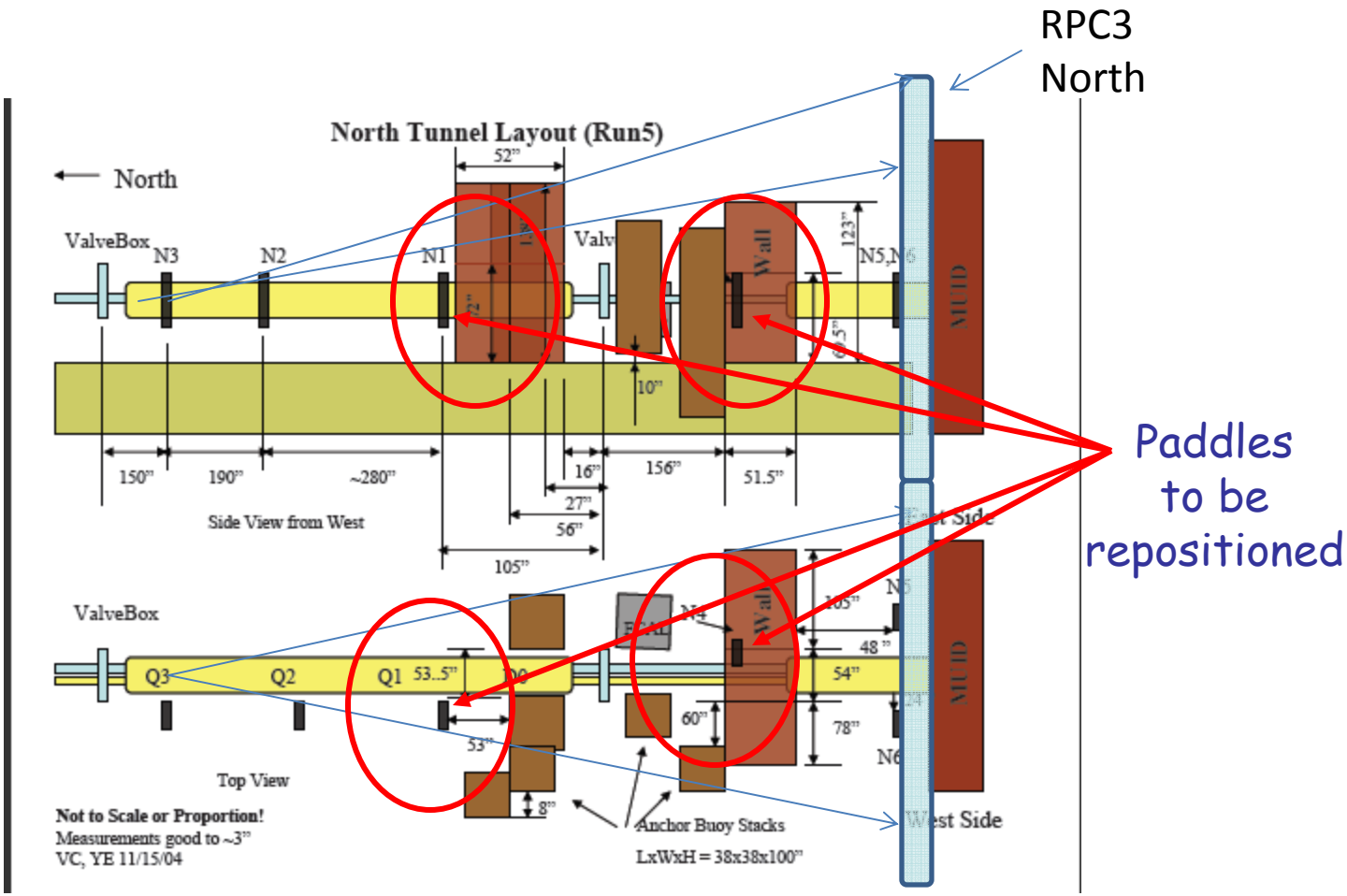
Introduction

During the current run, the RPC group has had problems with excessive background signals on the new RPC3 north and south detector subsystems at PHENIX. The group has concluded that the background should be mitigated by the addition of concrete and steel shielding in the north and south tunnel between the expected source(s) (Q3 magnets north annd south) and the RPC3 detector arrays.

CAD engineers designed and installed shielding per RPC group specifications during recent maintenance access days. To verify the effectiveness of the shielding so installed, the RPC group now proposes to reposition 4 scintillator detectors ("paddles") already installed in the north and south tunnels near the RPC3's to aid in quantifying the performance of the shielding as installed.

This presentation illustrates the mechanical and electrical efforts proposed to support this repositioning.

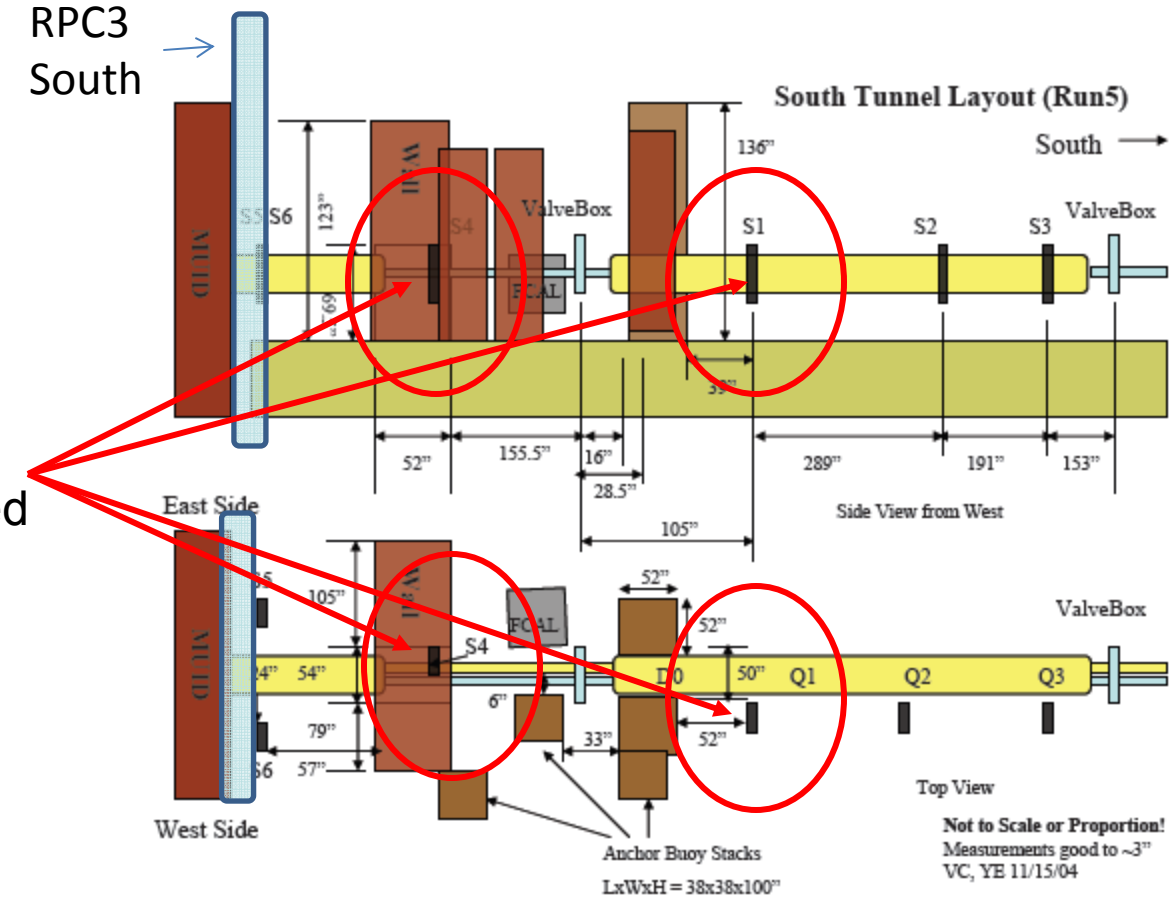
Approximate North tunnel layout near RPC3N

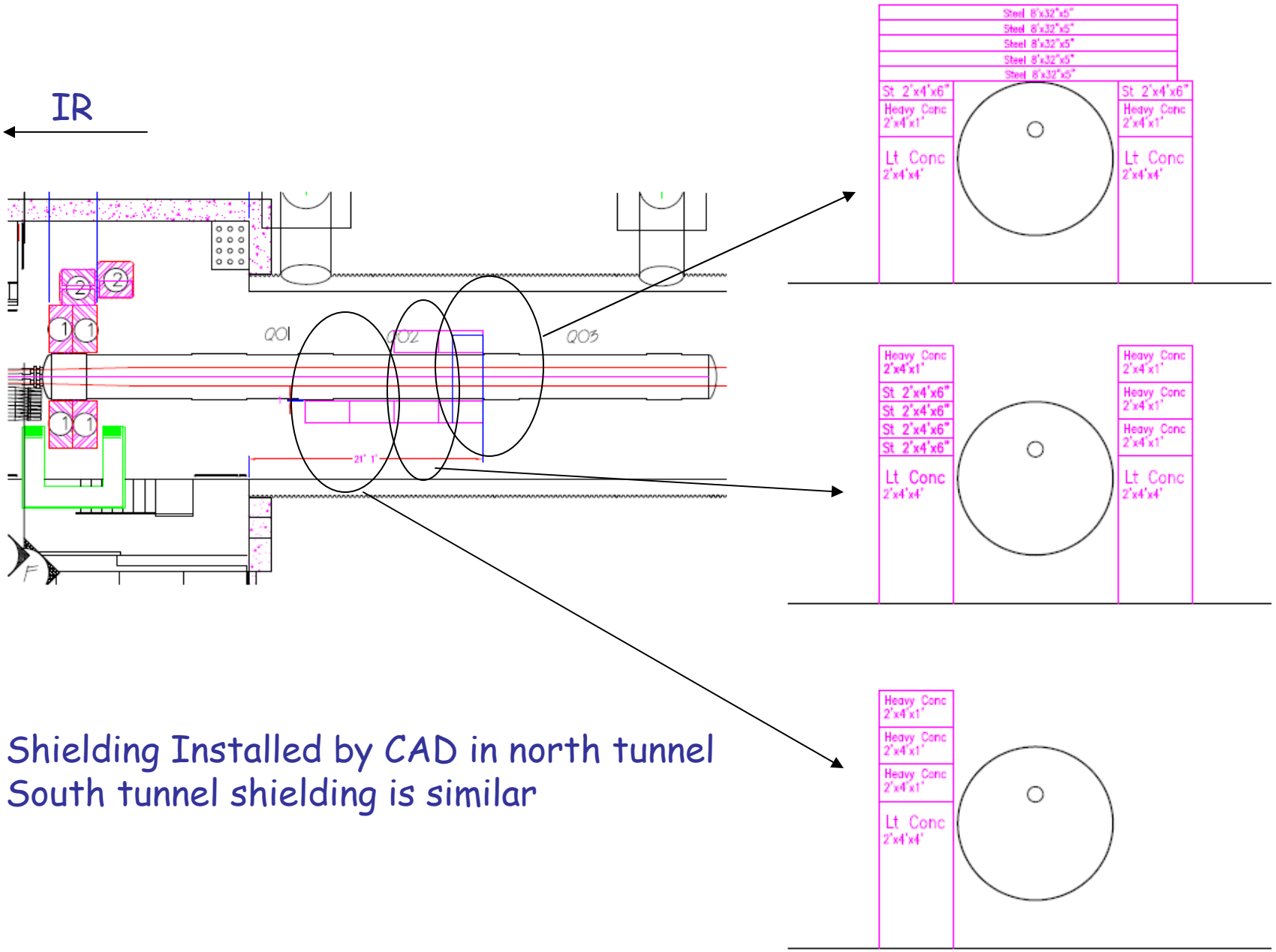


Approximate South tunnel layout near RPC3S

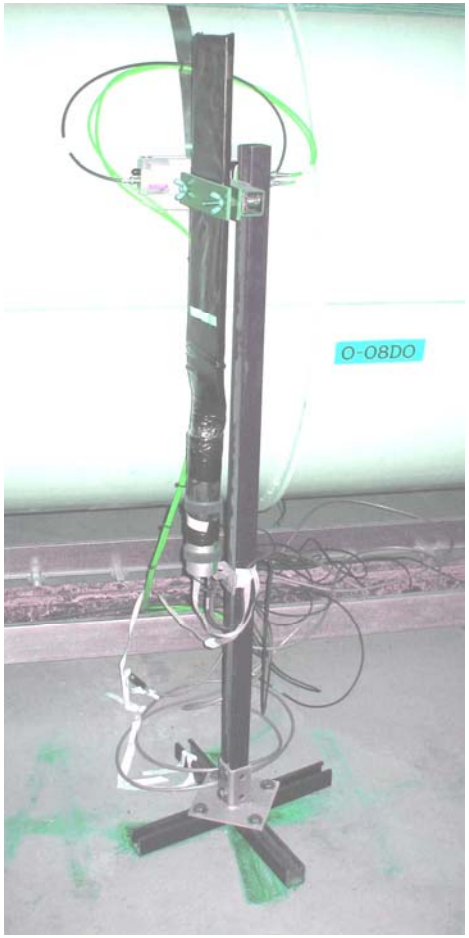
RPC3
South

Paddles
to be
repositioned





Shielding Installed by CAD in north tunnel
South tunnel shielding is similar



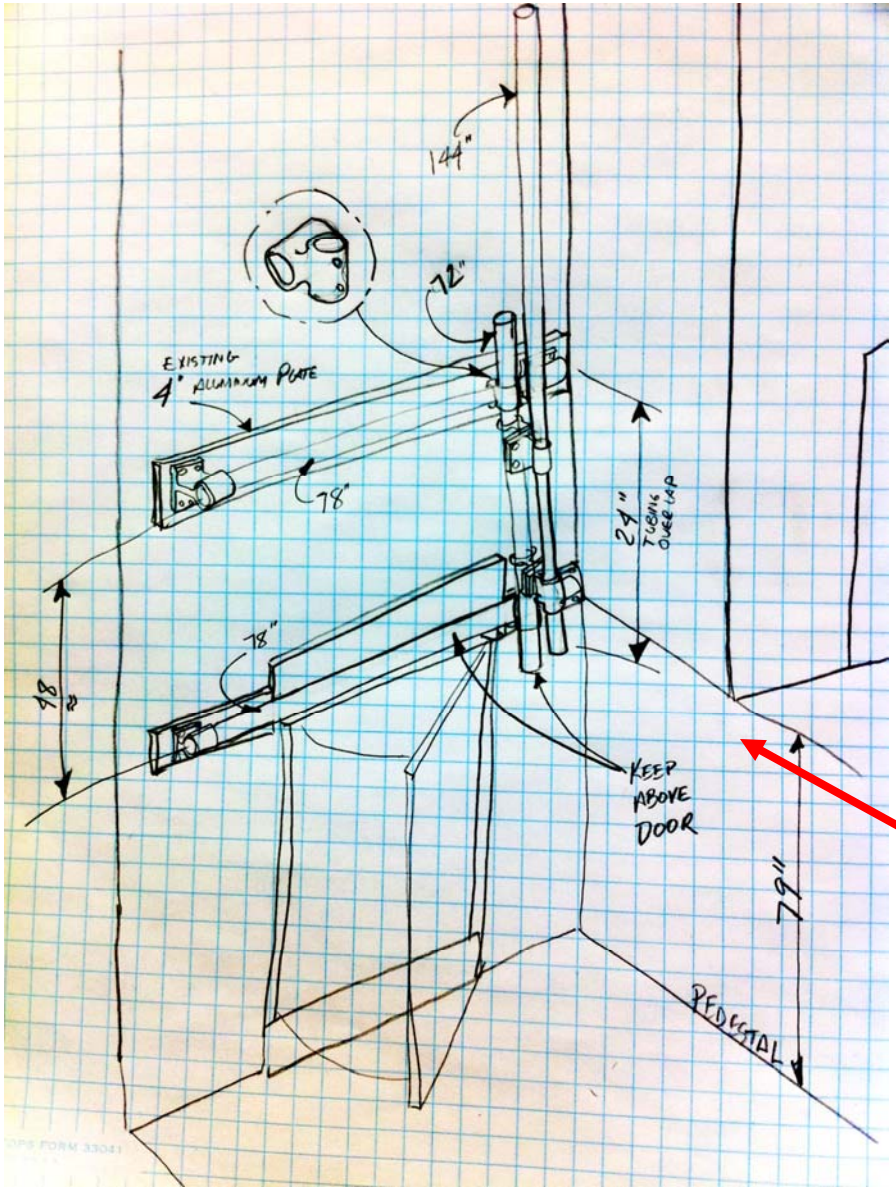
Typical paddle

The paddles are powered by LV from the FCAL rack and have the same Cockroft-Walton (HV generated on the base) as the FCAL. The signal cables are laboratory stock RG58, which is plenum rated.

A typical counter looks like the photograph at right and weighs 5-10 lbs.

The paddles, electronics and cables are already in use in the north and south tunnels, and will simply be repositioned.

RPC Scintillator Support



Materials have been procured,

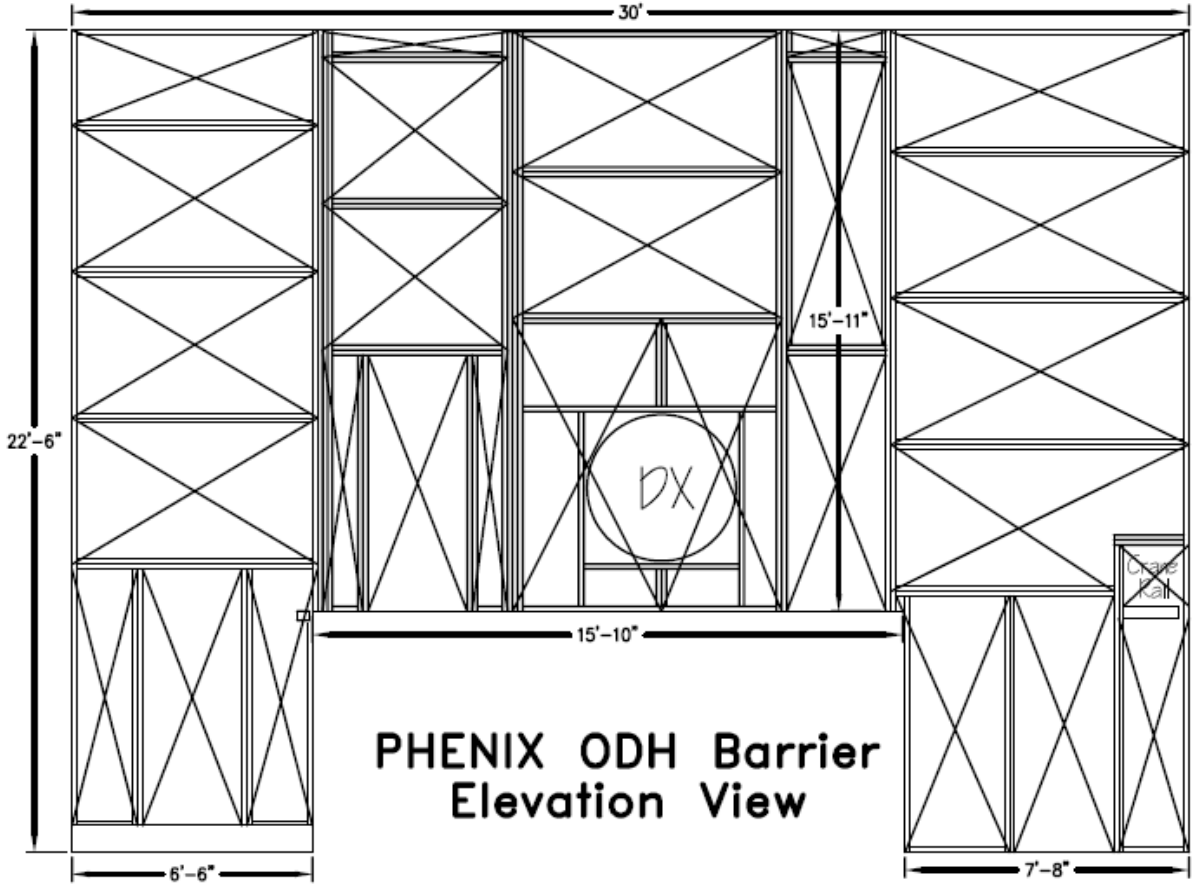
Expect to install during next scheduled maintenance access.

Estimated time to install 4 hours per paddle. Possible to install in parallel, depending on personnel availability.

(Basic support concept, implementation will differ in detail)

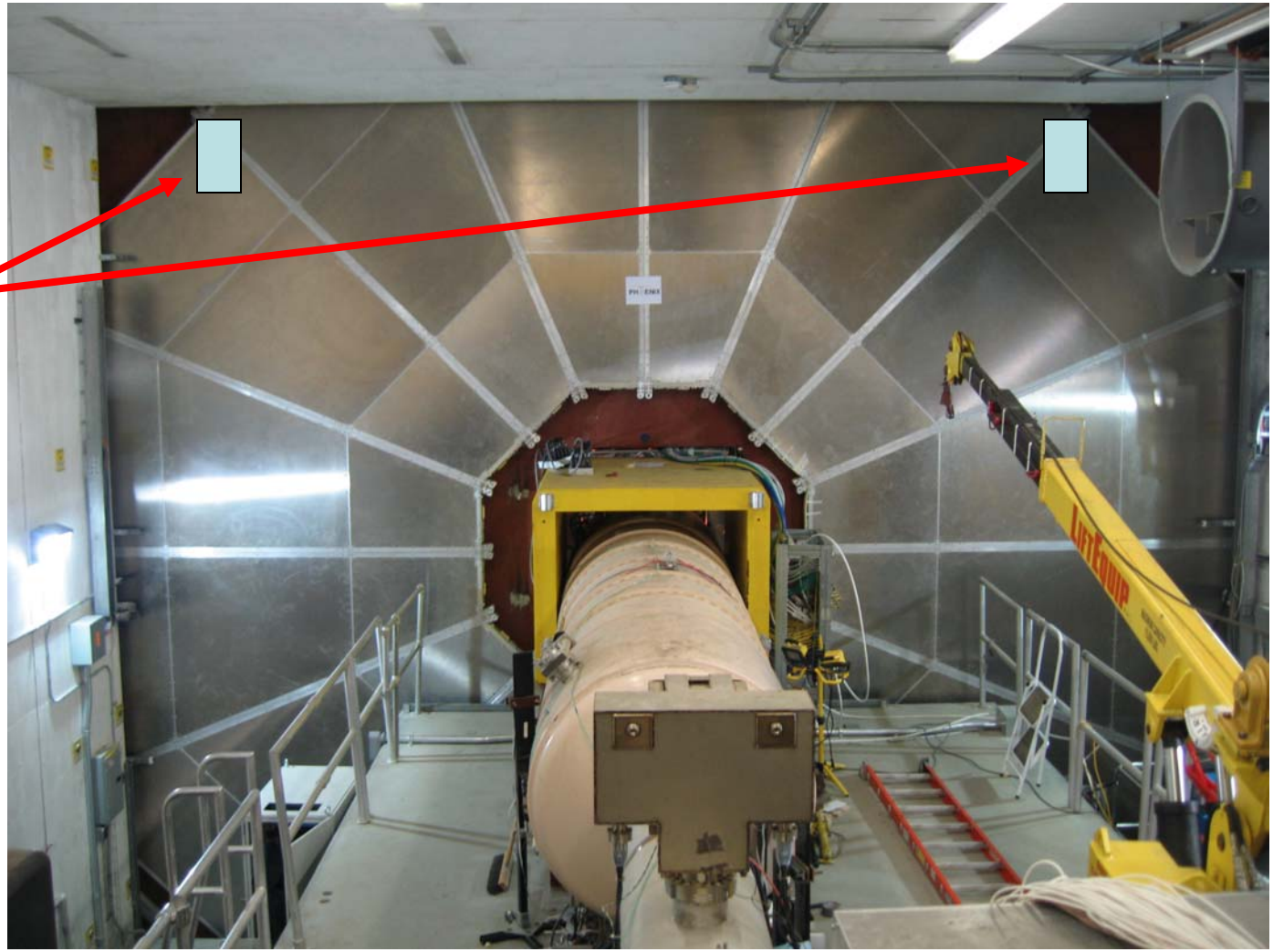
Typical elevation view of RPC Thermal/Vapor barrier. (North tunnel version shown, south tunnel version is similar.) Sections with "X" are foil covered foam walls with double steel unistrut framing.

Mechanical installation plan is to mount 1-1/2" schedule 40 aluminimum pipe in 2 horizontal locations to unistrut frame using pipe supports and $\frac{1}{4}$" self tapping screws. On each of these pipes will be a double pipeclamp with a swivel connection and locking set screws. These double pipe clamps will have one clamp on the horizontal pipe and the other on another vertical 1-1/2 " schedule 40 aluminum pipe onto which a paddle will be mounted.

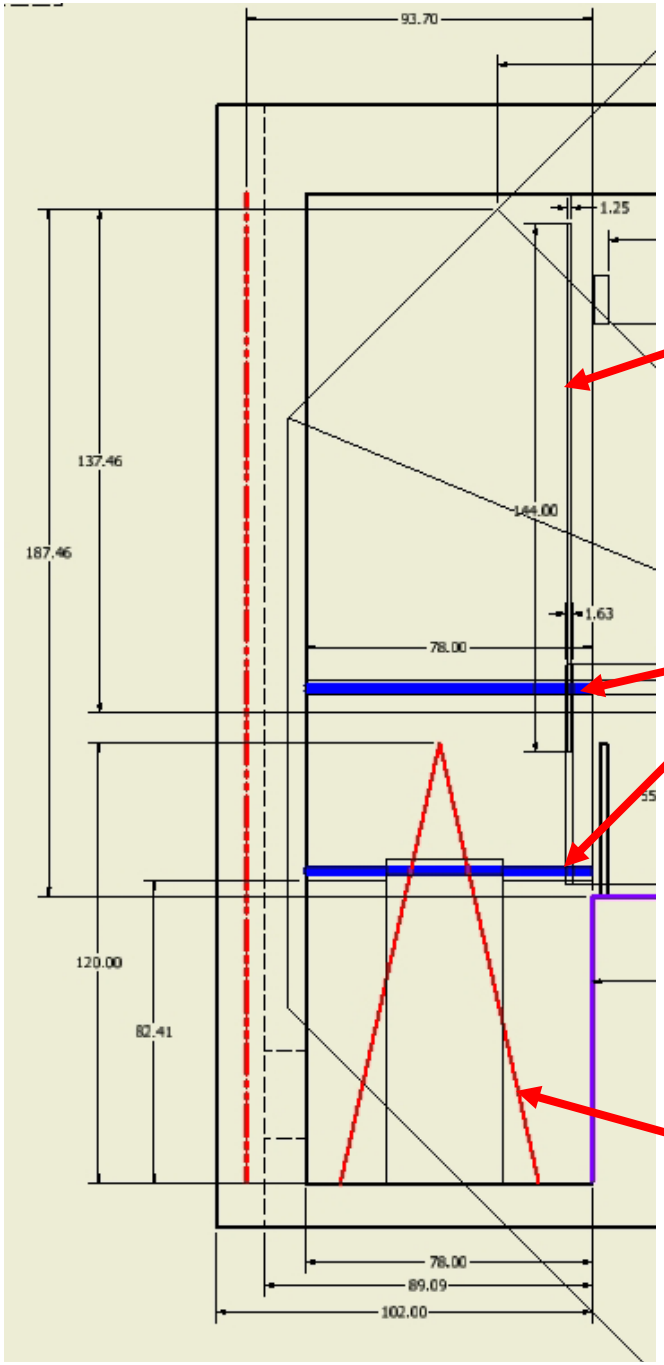


Approximate desired coverage areas for scintillator paddles.

Z position is dependent on the thermal vapor wall z position (which is different from east to west) and line-of-sight source of background. Some trial and error adjustment of east east-west and vertical locations of scintillator paddles is expected.



RPC3 without thermal vapor barrier, cable trays, etc. (south shown, north is similar)



Vertical pipe with scintillator paddle attached ("flagpole")

Horizontal pipes with double pipe clamps with swivel connection supporting "flagpole".

Horizontal position of scintillator paddle can be adjusted by loosening inner pipe clamps and sliding flagpole east or west. Vertical position of scintillator paddle can be adjusted by loosening outer pipe clamps and sliding flagpole up or down.

Horizontal pipes are mounted and adjustments can be made from a 10 foot step ladder.